Instant Broadband™ Series

EtherFast®
Cable/DSL Router

Model Nos.: **BEFSR11**
BEFSR41

User Guide

LINKSYS®

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FCC STATEMENT
The Instant Broadband EtherFast Cable/DSL Router has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used according to the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which is found by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment or device
- Connect the equipment to an outlet other than the receiver's
- Consult a dealer or an experienced radio/TV technician for assistance

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Table of Contents

Introduction 1
- Features 1
- Package Contents 2
- System Requirements 2

Getting to Know the 4-Port Cable/DSL Router 3
- The 4-Port Router's Rear Panel 3
- The 4-Port Router's Front Panel LEDs 4
- The Reset Button 5

Getting to Know the One-Port Cable/DSL Router 6
- The One-Port Router's Rear Panel 6
- The One-Port Router's Front Panel LEDs 7

Connecting Your Cable/DSL Router to Your Network 9
- Overview 9
- About Static & Dynamic IP Addresses 9
- Connecting Everything Together & Booting Up 10

Configuring the Cable/DSL Router 12
- Configuring Your Cable/DSL Router 12
- Configuring Your PCs to Connect to the Cable/DSL Router 15

The Cable/DSL Router's Web-based Utility 17
- Quick and Easy Administration 17
- Basic Features 18-23
- Advanced Features 24-29

Troubleshooting 30

Appendix 36
- How to Ping Your ISP's E-mail & Web Addresses 36
- Installing the TCP/IP Protocol 39
- Twisted-Pair Cabling 41
- Crimping Your Own Network Cables 42
- 4-Port Router Specifications 43
- One-Port Router Specifications 44
- Customer Support 45

Introduction

The Linksys EtherFast Cable/DSL Router

Congratulations on your purchase of a Linksys Instant Broadband EtherFast Cable/DSL Router. The EtherFast Cable/DSL Router is the perfect option to connect a small group of PCs to a high-speed Broadband Internet connection or to an Ethernet backbone. Configurable as a DHCP server, the EtherFast Cable/DSL Router acts as the only externally recognized Internet device on your local area network (LAN). The Router serves as an Internet firewall, protecting your network from being accessed by outside users. All incoming data packets are monitored and filtered. The router can also be configured to block internal users' access to the Internet.

Not only will all of your PCs now be able to enjoy your lightening-fast Broadband Internet connection, they will also be able to share internal network data. Add it all together and your small network will hum along faster than you ever thought possible.

Features

- Connects to a Broadband modem or to an Ethernet backbone.
- Equipped with a 4-port 10/100 Switch (BEFSR41 only).
- Connects all of your PCs to the Internet with only one purchased IP address.
- Creates a firewall to protect your PCs from outside intruders.
- Configurable through any networked PC's web browser using Netscape or Internet Explorer 4.0 or higher.
- Supports IPSec Pass-Thru
- Remotely administered through your internet connection.
- The switch dramatically speeds up your gaming and multimedia connections.
- Can simultaneously act as both a DHCP Server on the LAN and a DHCP Client on the WAN.
- Compatible with virtually all standard Internet applications.
- Administrators can block specific interior users' Internet access.
- DMZ Host option provides two-way communication between one PC and your Internet services.

Package Contents

- One Linksys Instant Broadband Cable/DSL Router
- One power adapter (4-Port Router only)
- One power cord
- One user guide and registration card

System Requirements

PC Requirements

- One RJ-45 Broadband Internet connection
- One PC with an installed 10Mbps, 100Mbps, or 10/100 Mbps Ethernet card
- TCP/IP network protocol for each PC
- UTP network cable with RJ-45 connector
- Microsoft Internet Explorer 4.0 or later, or Netscape Navigator 4.0 or later. (5.0 and 4.7, respectively, are strongly recommended.)

Getting to Know the 4-Port EtherFast Cable/DSL Router

The 4-Port Router's Rear Panel

The rear panel of the Router is where all of the Router's connections are made.

The 4-Port Router's Ports — BEFSR41 shown above

WAN — The WAN (Wide Area Network) Port is where you will connect your cable or DSL modem.

Uplink — The Uplink Port is where you can expand your network by connecting to another switch or hub. The Uplink Port is shared with Port 1. Uplinking to another Router, switch or a hub is done by simply running a cable from the Uplink Port to the other device. If the Uplink port is being used, Port 1 will not work.

Ports 1-4 — These four LAN (Local Area Network) ports are where you will connect networked devices, such as PCs, print servers, remote hard drives, and anything else you want to put on your network. If Port 1 is being used, the Uplink Port will not work.

Power — The Power Port is where you will connect the included AC Power adapter.

The 4-Port Router's Front Panel LEDs

The LAN Indicators

Power — *Green*. The Power LED illuminates when the Router is powered on.

Link/Act — *Green*. The Link/Act LED serves two purposes. If the LED is continuously illuminated, the Router is successfully connected to a device through the corresponding port (1, 2, 3 or 4). If the LED is flickering, the Router is actively sending or receiving data over that port.

Full/Col — *Green*. The Full/Col LED also serves two purposes. If this LED is continuously illuminated, the connection made through the corresponding port is successfully running in Full Duplex mode. If the LED is flickering, the connection is experiencing collisions. Infrequent collisions are normal. If this LED is flickering too often, there may be a problem with your connection. Check the Troubleshooting section on page 30 if you think there is a problem.

100 or **10/100** — *Orange*. The 100 LED illuminates when a successful 100Mbps connection is made through the corresponding port.

The WAN Indicators

Link — *Green*. The Link LED illuminates when a successful connection is made between the Router and your Broadband device or network.

Act — *Green*. The Act LED flickers when the Router is sending or receiving data over the broadband port.

Diag — *Red*. The Diag LED illuminates when the Router goes through its self-diagnosis mode during boot-up. It will turn off upon successful completion of the diagnosis. If this LED stays on for an abnormally long period of time, refer to Troubleshooting on page 30.

The Reset Button*

Briefly pressing the Reset Button will refresh the Router's connections, potentially clearing any jammed links.

Pressing the Reset Button and holding it in for a few seconds will clear all of the Router's data. This should be done only if you are experiencing heavy routing problems, and only after you have exhausted all of the other troubleshooting options. By resetting the Router, you run the risk of creating conflicts between your PCs' actual IP Addresses and what the Router thinks their IP Addresses should be. You may be forced to reboot the entire system(s).

If your router locks up, simply power it down for 3 to 5 seconds by removing the power cable from the Router's Power Port. Leaving the power off for too long could result in the loss of network connections.

* The Reset Button is located on the front of the 4-Port Router and on the rear of the One-Port Router.

Getting to Know the One-Port EtherFast Cable/DSL Router

The One-Port Router's Rear Panel

The rear panel of the Router is where all of the Router's connections are made, and where you can reset or configure the Router's LAN port.

The One-Port Router's Ports

WAN The WAN (Wide Area Network) Port is where you will connect your cable or DSL modem.

LAN The LAN (Local Area Network) port is where you will connect your Router to a network hub, switch, or similar port.

Power The Power Port is where you will connect the included AC Power adapter.

Buttons & Switches

The Reset Button Information on the Reset button can be found on page 5.

The Crossover Switch The Crossover Switch (X II) toggles the LAN port between crossover mode (X) and straight-through mode (II). If you are connecting the Router directly to a computer or to an Uplink port, choose crossover (X). For anything else, choose straight-through (II).

Note: *If you aren't sure whether to choose crossover or straight-through on the crossover switch, a good indicator is to check the Link LED on the front of the Router. If the Link light is not illuminated after the router is fully installed and configured, try switching the crossover switch over to the other option. If the Link LED illuminates then, you have made the correct choice.*

The One-Port Router's Front Panel LEDs

BEFSR11 shown above

The LAN Indicators

Power *Green*. The Power LED illuminates when the Router is powered on.

Link/Act *Green*. The Link/Act LED serves two purposes. If the LED is continuously illuminated, the Router is successfully connected to a device through the LAN port. If the LED is flickering, the Router is actively sending or receiving data over the LAN port.

Full/Col *Green*. The Full/Col LED also serves two purposes. If this LED is continuously illuminated, a connection is being successfully maintained through the LAN port. If the LED is flickering, the connection is experiencing collisions. Infrequent collisions are normal. If this LED is flickering too often, there may be a problem with your connection. Check the Troubleshooting section on page 30 if you think there is a problem.

10/100 *Orange*. The 10/100 LED illuminates when a successful 100Mbps connection is made through the corresponding port. If a 10Mbps connection is being made, the light will not be illuminated.

The WAN Indicators

Link *Green*. The Link LED illuminates when a successful connection is made between the Router and your Broadband device or network.

Act *Green*. The Act LED flickers when the Router is sending or receiving data over the broadband port.

Diag *Red*. The Diag LED illuminates when the Router goes through its self-diagnosis mode during boot-up. It will turn off upon successful completion of the diagnosis. If this LED stays on for an abnormally long period of time, refer to Troubleshooting on page 30.

Connecting the Cable/DSL Router to Your Network

Overview

Unlike a simple hub or switch, the setup of the Cable/DSL Router consists of more than simply plugging everything together. Because the Router acts as a DHCP server, you will have to set some values within the Router, and also configure your networked PCs to accept the IP Addresses the Router chooses to assign them.

You will need the following values from your ISP in order to install the Cable/DSL Router:

- Your broadband-configured PC's fixed Internet IP Address (if applicable)
- Your broadband-configured PC's Computer Name and Workgroup Name
- *Your Subnet Mask*
- *Your Default Gateway*
- *Your Primary DNS IP address*

} *Only if applicable*

Whoever installed your broadband access should have left this information with you. If not, call your ISP and they will be able to supply you with it.

About Static & Dynamic IP Addresses

Static IP Addresses A static IP address is an IP address permanently assigned to computer in a TCP/IP network. Static IP addresses are usually assigned to networked devices which are consistently accessed by multiple users, such as Server PCs, or printers. If you are using your Router to share your cable or DSL Internet connection, contact your ISP to see if they have assigned your home a static IP address. You will need that address during your Router's configuration.

Dynamic IP Addresses A dynamic IP address is an IP address that is automatically assigned to a client station (computer, printer, etc.) in a TCP/IP network. Dynamic IP addresses are typically assigned by a DHCP server, which can be a computer on the network or another piece of hardware, such as the Router. A dynamic IP address may change every time your computer connects to the network.

DHCP (Dynamic Host Configuration Protocol) DHCP is software that automatically assigns IP addresses to client stations logging onto a TCP/IP network. DHCP eliminates having to manually assign permanent IP addresses to every device on your network. DHCP software typically runs in servers and is also found in network devices such as Routers.

Connecting Everything Together & Booting Up

Once you are sure that you have the above values on hand, you can begin the Installation and Setup of your Cable/DSL Router.

Note: *Some ISPs—most notably some cable providers—configure their networks so that you do not have to enter a full Internet address into your web browser or e-mail application to reach your home page or receive your e-mail. If your Internet home page address is something very simple, such as "www", rather than "www.linksys.com", or your e-mail server's address is something similar to "e-mail" or "pop3", rather than "pop.mail.linksys.com", you won't be able to properly configure your Cable/DSL Router until you determine the actual Internet addresses of your Web and e-mail connections.*

You ***must*** *obtain this information prior to connecting the Router to your network. You can obtain this information by contacting your ISP, or you can turn to page 36 to learn how to* ping *for an IP address.*

1. **Power everything down**, including your **PCs**, your **Cable** or **DSL** modem and the **Router**.

2. A. **If you are using the 4-Port Cable/DSL Router**, connect a Network cable from one of your PCs' Ethernet ports to one of the LAN Ports on the back of the Router. Do the same with all the PCs you wish to connect to the Router. (LAN Port 1 will become inactive if you use the Uplink port.)

2. B. **If you are using the One-Port Cable/DSL Router**, connect a Network cable from the Router's LAN port to a hub or switch on your network. Refer to the note on page 7 to determine which setting you should choose for the Crossover Switch.

3. **Connect the network cable** from your Cable or DSL modem to the **WAN** port on the rear of the Router.

4. **Connect the power-supply cable** to the Power port on the rear of the Router, then plug the supplied AC power cable into a power outlet. Plug the other end into the back of the power adapter.
   - The Power LED will illuminate green as soon as the power adapter is connected.
   - The Diag LED will illuminate red for a few seconds while the Router goes through its internal diagnostic test. The LED will turn off when the self-test is complete.

5. **Power on the Cable or DSL modem**.

6. **Press the Reset button** on the front of the router. Hold the button in for three seconds, or until the Diag LED illuminates red. This restores the router's default settings.

The Hardware Installation is complete. Continue to the next page to configure the router's settings.

Configuring Your Network with the Cable/DSL Router

Note: *If the TCP/IP protocol is not configured on your PC, go to page 39 of the Appendix for TCP/IP installation instructions now.*

Configuring the Cable/DSL Router

Now that your Cable/DSL Router is wired into your network, you can begin configuring your system.

1. **Open your web browser** and type `http://192.168.1.1` in the browser's Address box. This number is the default IP address of your router. Press **Enter**.

2. **A username and password prompt** will appear. Leave the User Name box empty and type `admin` (the default password) in the **Password** box. Click **OK**.

Note: *If you have previously enabled an Internet Sharing Proxy Service on any of your PCs, you must disable it now.*

- *If you are running Netscape Navigator: Click **Edit** >> **Preference** >> **Advanced** >> **Proxies**> and click **Direct Connection to the Internet**.*
- *If you are running Internet Explorer v5 or better, click **Start**>> **Settings**>> **Control Panel**>> **Internet Options**>> **Connections**>> **LAN Settings**. Remove the checks from all three boxes. Click **OK** to continue.*

3. **The Cable/DSL Router's Setup page** will appear.

4. **Configure the following values**.

Router Name & Domain Name These fields allow you to supply a host and domain name for the Router. Some ISPs require these names as identification. You may have to check with your ISP to see if your Broadband Internet service has been configured with a host and domain name. In most cases, leaving these fields blank will work.

LAN IP Address These values refer to your internal network settings. Unless you have specific internal needs, there should be no reason to change these values. For the internal LAN, the default values are as follows.

- Private IP Address: 192.168.1.1
- Subnet Mask: 255.255.255.0

Note: *If you have an existing DHCP server on your LAN and you don't wish to use the router as your new DHCP server, you must assign your router a static IP address. The router's IP address must be compatible with your existing network. You can not have two DHCP servers running on one LAN at the same time.*

WAN IP Address These values refer to the outside network you connect to every time you access your Broadband Internet connection. Most Broadband ISPs assign their clients with a different IP address each time they log on. If this is the case with

your ISP, click **Obtain an IP Address Automatically** and continue to step 5. If your ISP assigns you a fixed IP address, click **Specify an IP Address** and enter the address into the **Subnet Mask, Default Gateway Address** and **DNS** fields provided by the ISP.

If you need to enable PPPoE support, choose **Enable**. If you do enable PPPoE, remember to remove any existing PPPoE applications already on your computer. (More information on *PPPoE* can be found on page 19.)

5. **When you have properly configured** the *Setup* page, click **Apply**, then click **Continue**.

6. **Choose the DHCP tab**.

7. **Unless you already have a DHCP server** on your internal network, choose **Enable** from the *DHCP Server* field. By choosing Enable, you will configure the Router to automatically assign IP addresses to each of your PCs. In the *Number of DHCP Users* box, enter the number of PCs you plan on networking to the Router, or leave it alone. Don't forget to change this number if, in the future, you add more PCs to your network.

8. Click **Apply**, then click **Continue**.

9. **Reset the power on the cable or DSL modem**, then restart the computer so the computer can obtain the new Router information.

Your Cable/DSL Router is now configured to your network. Please continue to the following section to complete your network setup.

Configuring Your PCs to Connect to the Cable/DSL Router

Note: *Ensure that a Network Card or adapter has been successfully installed into each PC you plan on configuring prior to continuing.*

Now that your Router is configured, you will have to configure your other PCs to accept the IP addresses that your Router will provide.

These instructions apply only to Windows 95 and Windows 98 machines. For TCP/IP setup under Windows NT, please refer to your Windows NT manual.

1. Click the **Start** button, select **Settings**, then **Control Panel**.

2. Double-click the **Network** icon.

3. In the **Configuration** window, select the **TCP/IP protocol line** that has been associated with your network card/adapter. If there is no TCP/IP line listed, go to page 39 to install the TCP/IP Protocol **now**.

4. Click the **Properties** button, then choose the **IP Address** tab. Select **Obtain an IP address automatically**. Press **OK**. You have completed the client settings.

5. Click **OK**. Windows may ask for original Windows installation files. Supply them as needed (i.e.: D:\win98, D:\win95, c:\windows\options\cabs.)

6. Windows will ask you to restart the PC. Click **Yes**.

Repeat steps 1-6 for each PC on your network. When all of your PCs are configured, the Cable/DSL Router Setup and Installation is complete.

If you would like, you may continue on to learn more about the router's Web-based Utility.

The Cable/DSL Router's Web-based Utility

Quick & Easy Administration

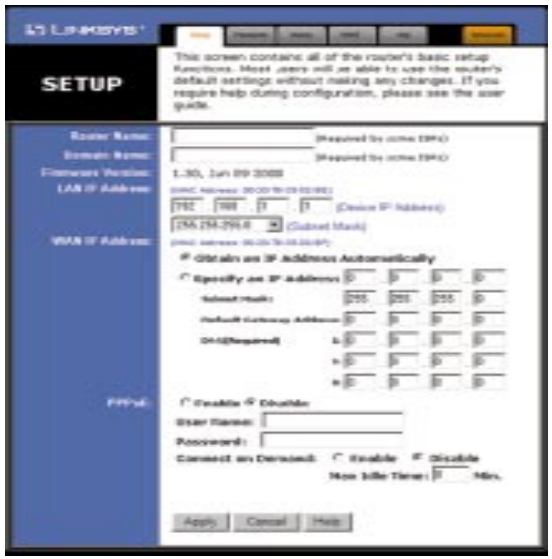
The EtherFast Cable/DSL Router has an internal integrated-circuit chip but no keyboard, monitor or mouse capabilities. Because of these limitations, an administrative utility has been programmed into that chip. All router-based administrative tasks are performed through this utility. The utility can be accessed by any PC on the network by typing `http://192.168.1.1` into the PC's web browser address window.

Upon entering the address into the web browser, a password request page will pop up.

Leave the User Name field empty, but type "**admin**" into the Password field.

On the following pages you will find brief descriptions of each utility web-page and each page's more important functions. More detailed explanations and instructions can be found by clicking each page's **Help** button. To apply any settings you've altered on any page, click the **Apply** button, then click **Continue**. To clear any values you've entered on any page, click **Cancel**.

Setup



Note: *The Setup page shown in this graphic may differ from the one seen on your router.*

The Basic Setup screen is the first screen you will see when you access the Utility. If you have already installed and setup your router, you have already seen this screen and have already properly configured all of the screen's values.

- **Router Name** This entry is necessary for some ISPs.
- **Domain Name** This entry is necessary for some ISPs.
- **Firmware Version** This entry shows the version of the firmware you are using. Future versions of the Router's Firmware may become available on the Linksys Website.
- **LAN IP Address and Subnet Mask** The IP Address and Subnet Mask of the router as it is seen on the internal LAN. The default value is 192.168.1.1 for IP and 255.255.255.0 for Subnet Mask.
- **WAN IP Address and Subnet Mask** The IP Address and Subnet Mask of the router as seen by external users on the Internet (including your ISP). If set to Obtain an IP address automatically, these values are assigned by your ISP.
- **Default Gateway Address** Your ISP will provide you with the Gateway IP Address. If set to Obtain an IP address automatically, these values are assigned by your ISP.

- **DNS (Domain Name Server) IP Address** Your ISP will provide you with at least one DNS IP Address. If set to Obtain an IP address automatically, these values are assigned by your ISP.

You can test and see if the above settings are correct by successfully connecting to the Internet.

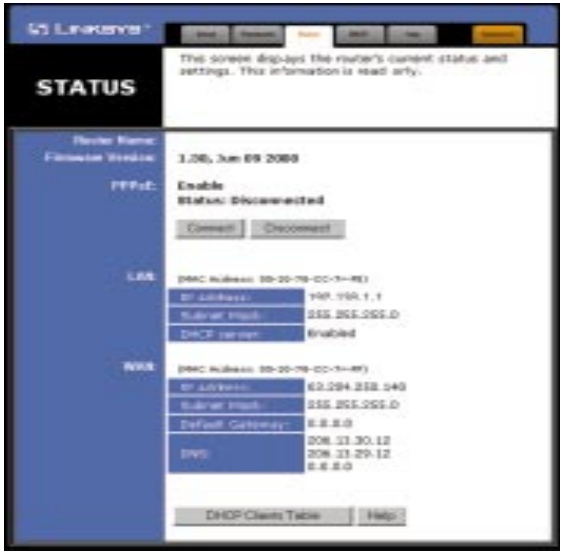
- **PPPoE (Point-to-Point Protocol over Ethernet)** Some DSL-based ISPs use PPPoE to establish communications with an end-user. If you are connected to the Internet through a DSL line, check with your ISP to see if they use PPPoE. If they do, you will have Enable it. To enable PPPoE:
  1. Choose the **Enable** option within the PPPoE area of the *Setup* screen.
  2. Enter the **User Name** you use to log onto your Internet connection.
  3. Enter your corresponding **Password**.
- **Connect on Demand** If you aren't actively using the Internet, you can configure your Router to cut your connection with your ISP after a certain period of time. If you have been disconnected due to inactivity, *Connect on Demand* enables your Router to automatically re-establish your connection as soon as you attempt to access the Internet again. If you wish to activate *Connect on Demand*, choose the **Enable** option.
- **Max Idle Time** The Max Idle Time is the amount of time you would like to pass before the Router drops your Internet connection due to inactivity. If you want your Internet connection to remain on at all times, enter zero (0) in this field.

Password

It is strongly recommended that you set a password for the router. When you first power up the router, you will notice that the Password setting has been left blank. When the password field is blank, all users on your network can access the router simply by entering the unit's IP address into their web browser's location window.

If you set the Restore Factory Default option and click Apply, you will clear all of the router's settings. Do not restore to the factory defaults unless you are having difficulties with the Router. Once the Router is reset, you will have to re-enter your configuration information.

Status



This screen provides the current status of the device. All of the information provided is read-only.

- **Router Name** This field shows the name of this device. This entry is necessary for some ISPs.
- **Firmware Version** This field shows the installed version of the firmware.
- **PPPoE (Point-to-Point Protocol over Ethernet)** This field shows whether or not you have enabled the use of the Router's PPPoE support. Click the Connect button if your PPPoE status is Disconnected. This will initiate a connection to your ISP. Click Disconnect if you want to cut your connection to your ISP.
- **LAN** These fields display the current IP Address and Subnet Mask of the router, as seen by users on your internal network.
- **DHCP server** This field shows the status of the router's DHCP server function. This option is either enabled or disabled.
- **WAN** These fields display the IP Address, Subnet Mask and Gateway IP of the router as seen by external users on the Internet.
- **DNS (Domain Name Server) IP Address** This field shows the IP Address of the DNS currently being used. Multiple DNS IP settings are common. The first available DNS entry is used in most cases.

DHCP

A DHCP (Dynamic Host Configuration Protocol) Server automatically assigns IP addresses to each computer on your network. Unless you already have one, it is highly recommended that your router be set up as a DHCP server.

- **DHCP Server** Check the **Enable** option to enable the DHCP server option of the router. If you already have a DHCP server on your network, set the router's DHCP option to **Disable**.
- **Starting IP Address** Enter a numerical value for the DHCP server to start with when issuing IP addresses.
- **Number of DHCP users** Enter the maximum number of PC that you want the DHCP server to assign IP addresses to, with the absolute maximum being 253.
- **DHCP Client Table** Click on the **Client Table** button to show the current DHCP Client information. (This information is stored in temporary memory, so the list of clients could disappear.)

Help

Here you will find links to all of the Utility's internal support documentation, as well as the application that upgrades the Router's firmware. To upgrade the Router's firmware:

1. Downloaded the latest firmware version from the Linksys website (www.linksys.com).
2. Go to the *Help* screen (above).
3. Click **Upgrade Firmware**. A new page will appear (below).

4. Enter your Router's administration password into the *Password Confirm* box.
5. Click the **Browse** button and find the firmware upgrade file that you downloaded from the Linksys website. Double-click the **upgrade file**.
6. Click the **Upgrade** button and follow the instructions there.

Filters

Filters block specific internal users from accessing the Internet. You can set up a filter through an IP address or a network Port number.

To Modify Filter Settings

- Enter the IP addresses you wish to filter into the IP address fields. The users who have these IP addresses will not be able to access the Internet.

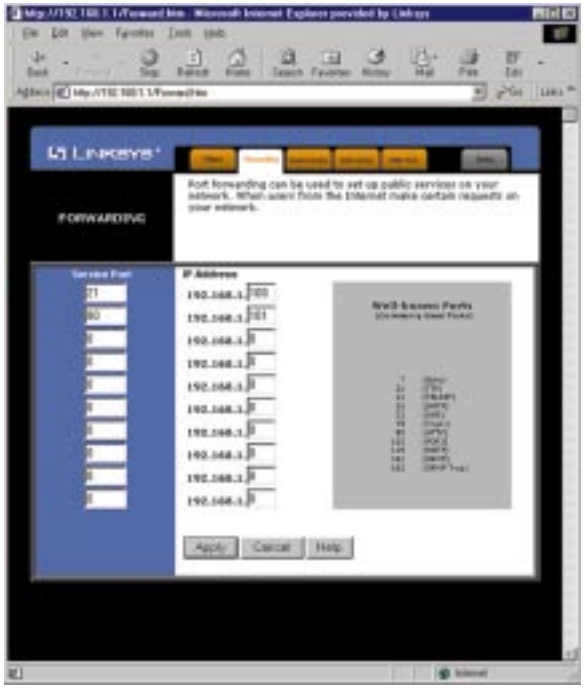
- You can also filter users by entering their network port number. Enter the port numbers you want to filter into the port numbers fields. Users who are connected to the Router will no longer be able to access any port number listed there.

Block WAN Request

- By enabling the *Block WAN Request* feature, you can prevent your network from being pinged, or detected, by other Internet users. The *Block WAN Request* feature also adds another measure of security to your network by hiding your network ports. Both functions of the *Block WAN Request* feature make it more difficult for outside users to work their way into your network.

Click the **Apply** button to save any changes.

Forwarding



Port forwarding sets up public services on your network. When users from the Internet make certain requests of your network, the router will forward those requests to the appropriate computer. The router's DHCP function must be disabled to use Forwarding.

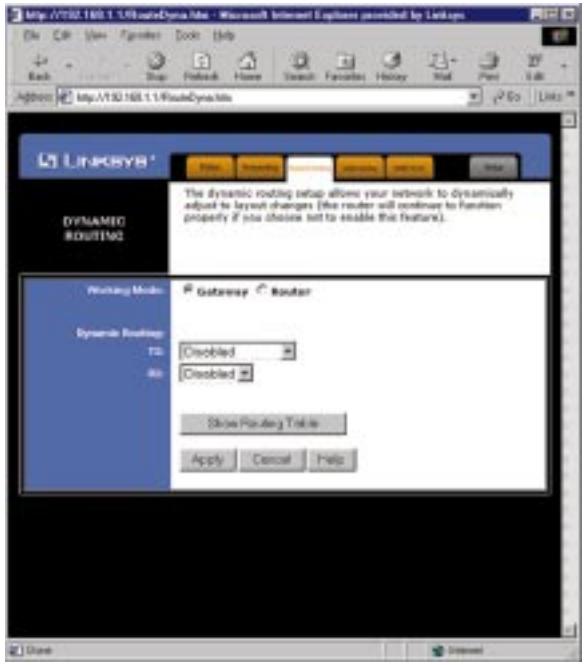
Forwarding is generally used to set up a webserver, ftp server, or e-mail server on your network. To add a server using Forwarding:

1. Enter the port number used by the server. On the same line, enter the IP Address of the server that you want the Internet users to be able to access.

2. Configure as many entries as you would like until all of the link entries are filled.

3. Click the Apply to save the settings.

Dynamic Routing



With Dynamic Routing you can automatically adjust to physical changes in the network's layout. The router, using the RIP protocol, determines the network packets' route based on the fewest number of hops between the source and the destination. The RIP protocol regularly broadcasts routing information to other routers on the network. To set up Dynamic Routing:

1. Choose the correct working mode. **Gateway Mode** should be used if your Linksys router is hosting your network's connection to the Internet. **Router Mode** should be selected if the router exists on a network with other routers.

2. Choose the **protocol** by which you transmit data on the network.

3. Choose the protocol by which the Router receives network data.

4. Click the Apply button to save your changes.

Static Routing

If your Router is connected to more than one network, it may be necessary to set up a static route between them. A static route is a pre-determined pathway that network information must travel to reach a specific host or network. Click the **Show Routing Table** button to view the current static routing configuration.

To create a static route entry:

1. Select **Static Route Entry** from the drop down list. The Cable/DSL Router supports up to 20 static route entries.

(*continued on next page...*)

2. Enter the following data to create a new static route:

   Destination LAN IP The Destination LAN IP is the Address of the remote network or host to which you want to assign a static route. Enter the IP address of the host for which you wish to create a static route here. If you are building a route to an entire network, be sure that the network portion of the IP address is set to zero (0). For example, the Router's standard IP address is 192.168.1.1. Based on this address, the address of the network to which the Router is connected is 192.168.1, with the last digit (1, in this case) determining the Router's place on the network. Therefore you would enter the IP address 192.168.1.0 if you wanted to route to the Router's entire network, rather than just to the Router.

   Network Mask The Network Mask (also known as the Subnet Mask) determines which portion of an IP address is the network portion, and which portion is the host portion. In the example above the Network Mask is 255.255.255.0. This determines (by using the values 255) that the first three numbers of an network IP address identify this particular network, while the last digit (from 1 to 254) would identify the specific host.

   Gateway IP This IP address should be the IP address of the gateway device that allows for contact between the Router and the remote network or host.

3. Click the **Apply** button to save your changes.

DMZ Host

The DMZ Host setting allows one local user to be exposed to the Internet to use a special-purpose service such as Internet gaming or Video-conferencing.

To expose one computer, enter the computer's IP address and click the **Apply** button. Inactivate DMZ by entering a zero (0).

Troubleshooting

Common Problems and Solutions

This section provides possible solutions to problems regarding the installation and operation of the Cable/DSL Router. Read below description to solve your problems. If you can't find an answer here, check the Linksys website at www.linksys.com.

1. I Can't connect to the Cable/DSL Router.
   - The Cable/DSL Router is properly installed, LAN connections are OK, and it is powered ON.
   - Ensure that your PC and the Cable/DSL Router are on the same network segment. If you are not sure, initiate the DHCP function, let the PC get the IP address automatically.
   - Ensure that your PC is using an IP Address within the default range of 192.168.1.2 to 192.168.1.254 and thus compatible with the Cable/DSL Router default IP Address of 192.168.1.1
   - Also, the Subnet Mask should be set to 255.255.255.0 to match the Cable/DSL Router. In the Cable/DSL Router, you can check these settings by using Control Panel-Network to check the Properties for the TCP/IP protocol.

2. The Diag LED stays lit when it shouldn't.
   - The Diag LED lights up when the device is first powered up. Meantime, the system will boot up itself and check for proper operation. After finishing the checking procedure, the LED turns off to show the system is working fine. If the LED remains lit after this time, the device is not working properly. Try to re-flash the firmware by assigning a static IP address to the computer, then upgrade the firmware again. If that doesn't help, contact your dealer for further inspection.

3. I can't browse through the Cable/DSL Router.
   - Check if both ends of the network cable and power adapter are properly connected. Check if the status LEDs on the front panel are functioning properly.
   - If using Windows 95 or Windows 98, check the TCP/IP setup on the client side. Run "**winipcfg**" by clicking on the **Start** button, then selecting **Run**. The PC should have an IP address of 192.168.1.xxx ("xxx" is from 2 to 254.) Subnet Mask is 255.255.255.0, the default gateway IP

should be the Router's IP Address, and DNS (in "More".)
   - Same as above, check the same setup values in the Status Monitor page of the Cable/DSL Router.

4. When I enter a URL or IP address, I get a time out error.
   - Check if other PCs work. If they do, ensure that your workstations IP settings are correct (IP address, Subnet Mask, Default gateway and DNS)
   - If the PCs are configured correctly, but still not working, check the Cable/DSL Router. Ensure that it is connected and ON. Connect to it and check its settings. (If you cannot connect to it, check the LAN and power connections.)
   - If the Cable/DSL Router is configured correctly, check your Internet connection. (DSL/Cable modem etc.) to see that it is working correctly.

5. I can't obtain an IP address from my cable or DSL modem.
   - Ensure that all of your cabling is properly connected and that all of the router's WAN and LAN LEDs are correctly illuminated.
   - Power down your cable or DSL modem for a few seconds. Turn it back on. After the modem goes through its self-test, check to see if you now have an IP address.
   - Ensure that your cable or DSL modem is DHCP-capable.
   - You may have to enter the router or host name in the Setup page of the Router's web-based utility. Go to page 18 for more information.
   - Your ISP may require Mac Addresses. Check with your ISP. This address can be obtained in the Status screen of the Router's Web-based Utility.

Frequently Asked Questions

What is the maximum number of IP addresses that the Cable/DSL Router will support? The Router will support to 253 IP addresses.

Is IPSec Pass-Thru supported by both the 4-Port and the 1-Port Router? Yes, it is a built-in feature that the router automatically enables.

Where is the Cable/DSL Router installed on the network? In a typical environment, the Router is installed between the Cable/DSL Modem and the LAN. Plug the Cable/DSL Router into the Cable/DSL Modem's Ethernet port.

Does the Cable/DSL Router support IPX or AppleTalk? No. TCP/IP is the only protocol standard for the Internet and has become the global standard for communications. IPX, a NetWare communications protocol used only to route messages from one node to another, and AppleTalk, a communications protocol used on Apple and Macintosh networks, can be used from LAN to LAN connections, but those protocols cannot connect from WAN to LAN.

Does the WAN connection of the Cable/DSL Router support 100Mb Ethernet? Because of the speed limitations of broadband Internet connections, the Cable/DSL Router's current hardware design supports 10Mb Ethernet on its WAN port. It does, of course, support 100Mbps over in the auto-sensing Fast Ethernet 10/100 switch on the LAN side of the router. (The 4-Port Router only.)

What is Network Address Translation and what is it used for? Network Address Translation (NAT) translates multiple IP addresses on the private LAN to one public address that is sent out to the Internet. This adds a level of security since the address of a PC connected to the private LAN is never transmitted on the Internet. Furthermore, NAT allows the Cable/DSL Router to be used with low cost Internet accounts, such as DSL or cable modems, where only one TCP/IP address is provided by the ISP. The user may have many private addresses behind this single address provided by the ISP.

Does the Cable/DSL Router support any operating system other than Windows 95, Windows 98, Windows 2000, or Windows NT? Yes, but Linksys does not, at this time, provide technical support for setup, configuration or troubleshooting of any non-Windows operating systems.

Does the Cable/DSL router support ICQ send file? Yes, with the following fix: ICQ menu-> preference -> connections tab-> check "I am behind a firewall or proxy", and set the firewall time-out to 80 seconds in firewall setting. The Internet user can then send a file to a user behind the router.

How do I get Napster to work with the Router? Napster is fully compatible with the Router and requires no special settings.

I setup an Unreal Tournament Server, but others on the LAN cannot join. What do I need to do? If you have a dedicated Unreal Tournament server running, you need to create a static IP for each of the LAN computers and forward ports 7777, 7778, 7779, 7780, 7781, and 27900 to the IP address of the server. If you want to use the UT Server Admin, forward another port (8080 usually works well), then in the [UWeb.WebServer] section of the server.ini file, set the ListenPort to 8080 (to match the mapped port above) and ServerName to the IP assigned to the router from your ISP.

Can multiple gamers on the LAN get on one game server and play simultaneously with just one public IP address? It depends on the which network game or what kind of game server you are using. For example, Unreal Tournament supports multi-login with one public IP.

How do I get *Half-Life: Team Fortress* to Work with the Router? The default client port for Half-Life is 27005. The computers on your LAN need to have "+clientport 2700x" to the HL shortcut command line; the x would be 6, 7, 8, and on up. This lets multiple computers connect to the same server. *One problem:* version 1.0.1.6 won't let multiple computers with the same CD key connect at the same time, even if on the same LAN (not a problem with 1.0.1.3). As far as hosting games, the HL server does not need to be in the DMZ. Just forward port 27015 to the local IP of the server computer. There remains, however, a problem with people being booted after a few minutes with an "illegible server message."

How can I not receive corrupted FTP downloads? If you are experiencing corrupted files when you download a file with your FTP client, try using another FTP program.

Web page hangs, corrupt downloads, or nothing but junk characters are being displayed on the screen. What do I need to do? Force your NIC to 10Mbps or half duplex mode, and turn off the "Autonegotiate" feature of your NIC as a temporary measure. (Please look at the Network Control Panel, in your Ethernet Adapter's Advanced Properties tab.). Check our website at www.linksys.com for more information.

If all else fails in the installation, what can I do? Reset the router by holding down the reset button for at least three seconds and reset your cable or DSL modem by powering the unit off and then on. Obtain and flash the latest firmware release that is readily available on Linksys website, www.linksys.com.

How will I be notified of new router firmware upgrades? All Linksys firmware upgrades are posted on the Linksys website at www.linksys.com, where they can downloaded for free. The router's firmware can be upgraded with TFTP programs.

Does the Cable/DSL Router support IPsec? A new IPsec Pass Through features is now available in firmware versions 1.30 and later, which can be downloaded at www.linksys.com.

Will the router function in a Macintosh environment? Yes, but the router's setup pages are accessible only through Internet Explorer v4.0 or Netscape Navigator v4.0 or higher for Macintosh.

With which type of firewall is the router equipped? The Cable/DSL router uses NAT and TCP/IP port inspections.

Does the Router do Stateful packet inspection? No

I am not able to get the web configuration screen for the router. What can I do? You may have to remove the proxy settings on your Internet browser, e.g., Netscape Navigator or Internet Explorer. Or remove the dial-up settings on your browser. Check with your browser documentation.

What is DMZ? Demilitarized Zone (DMZ) allows one IP Address (computer) to be exposed to the Internet. Some applications require multiple TCP/IP ports to be open. It is recommended that you set your computer with a static IP if you want to use DMZ.

If DMZ is used, does the exposed user share the public IP with the Router? No.

Does the Router pass PPTP packets or actively route PPTP sessions? The router allows PPTP packets to pass through.

What is the maximum number of users supported by the router? The router supports up to 253 users.

Is the Router cross-platform compatible? Any platform that supports Ethernet and TCP/IP is compatible with the router.

Will the Router allow me to use my own public IPs and Domain, or do I have to use the IPs provided by the router? The router mode allows for customization of your public IPs and Domain.

How many ports can be simultaneously forwarded? Theoretically, the router can establish 520 sessions at the same time, but you can only forward 10 ports.

Does the Router replace a modem? Is there a cable or DSL modem in the router? No, this version of the router must work in conjunction with a cable or DSL modem.

Which modems are compatible with the router? The router is compatible with virtually any cable or DSL modem that supports Ethernet.

What are the advanced features of the router? The router's advanced features include Filters, Forwarding, Dynamic Routing, Static Routing, and DMZ host.

What is the maximum number of VPN sessions allowed by the router? At least one session.

How big is the memory buffer on the router? 512kb.

Does Linksys provided syslog support? No, Linksys does not currently provide syslog support.

How can I check whether I have static DHCP IP Addresses? Consult your ISP to confirm the information.

How do I get mIRC to work with the Router? Set port forwarding to 113 for the computer on which you are using mIRC.

Appendix

How to Ping Your ISP's E-mail & Web Addresses

Virtually all Internet addresses are configured with words or characters (i.e., www.linksys.com, www.yahoo.com, etc.) In actuality, however, these Internet addresses are assigned to IP addresses, which are the true addresses on the Internet. For example, www.linksys.com is actually 206.135.116.3. Type it into your web browser and you will wind up at the Linksys home page every time.

IP and web addresses, however, can sometimes be long and hard to remember. Because of this, certain ISPs will shorten their server addresses to single words or codes on their users' web browser or e-mail configurations. If your ISP's E-mail and Web server addresses are configured with single words ("www", "e-mail", "home", "pop3", etc.) rather than whole Internet Addresses or IP Addresses, your Router may have problems sending or receiving mail and accessing the Internet. This happens because your Router has not been configured by your ISP to accept their abbreviated server addresses.

The solution is to determine the true web addresses behind your ISPs code words. You can determine the IP and web addresses of your ISP's servers by "pinging" them.

If you don't have your ISP's web and e-mail IP Addresses, you *must* either get them from your ISP or follow these steps *prior* to connecting your Cable/DSL Router to your network.

Step One: Pinging an IP Address

The first step to determining your ISP's web and e-mail server address is to ping its IP Address.

1. **Power on the computer and the cable or DSL modem**, and restore the network configuration set by your ISP if you have since changed it.

2. **Click Start**, then **Run,** and type "command". This will bring up the DOS Window.

3. **At the DOS command prompt**, type "ping mail" (assuming that the location for which you're trying to find an IP address is configured as "mail"). Press **Enter**. Information such as the following data, taken from a ping of Microsoft Network's e-mail server, will be displayed.

```
C:\>ping mail

Pinging mail [24.53.32.4] with 32 bytes of data:

Reply from 24.53.32.4: bytes=32 time<10ms TTL=128
Reply from 24.53.32.4: bytes=32 time<10ms TTL=128
Reply from 24.53.32.4: bytes=32 time<10ms TTL=128
Reply from 24.53.32.4: bytes=32 time<10ms TTL=128

Ping statistics for 24.53.32.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0%
   loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum =  0ms, Average =  0ms
```

4. **Write down the IP address returned by the ping command**. (In the example above: 24.53.32.4.) This IP address is the actual IP address of the server "mail", or any other word or value you have pinged.

Step Two: Pinging for a Web Address

While the IP address returned above would work as your e-mail server address, it may not be permanent. IP Addresses change all the time. Web addresses, however, usually don't. Because of this, you're likely to have less problems by configuring your system with web addresses rather than IP addresses. Follow the instructions below to find the web address assigned to the IP address you just pinged.

1. **At the DOS command prompt**, type "ping -a 24.53.32.4", where 24.53.32.4 is the IP address you just pinged. Information such as the following data will be displayed.

```
C:\>ping -a 24.53.32.4

Pinging mail.msnv3.occa.home.com [24.53.32.4] with
   32 bytes of data:

Reply from 24.53.32.4: bytes=32 time<10ms TTL=127
Reply from 24.53.32.4: bytes=32 time<10ms TTL=127
Reply from 24.53.32.4: bytes=32 time<10ms TTL=127
Reply from 24.53.32.4: bytes=32 time<10ms TTL=127

Ping statistics for 24.53.32.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0%
   loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum =  0ms, Average =  0ms
```

2. **Write down the web address returned by the ping command**. (In the example above: mail.msnv3.occa.home.com.) This web address is the web address assigned to the IP address you just pinged. While the IP address of "mail" could conceivably change, it is likely that this web address will not.

3. **Replace your ISP's abbreviated server address** with this extended web address in the corresponding Internet application (web browser, e-mail application, etc.).

Once you have replaced the brief server address with the true server address, your Router should have no problem accessing the Internet through that Internet application.

Installing the TCP/IP Protocol

Follow these instructions to install the TCP/IP Protocol on one of your PCs *only* after a network card has been successfully installed inside the PC. These instructions are for Windows 95 and Windows 98. For TCP/IP setup under Windows NT, please refer to your Windows NT manual.

1. Click the **Start** button. Choose **Settings**, then **Control Panel**.

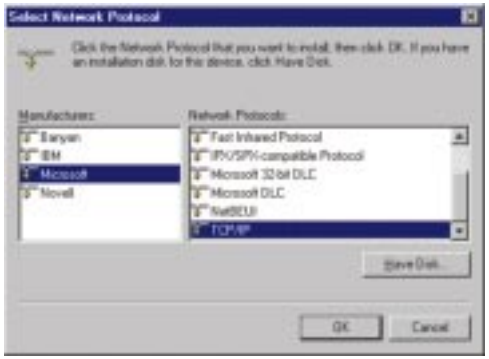
2. Double-click the **Network** icon. Your Network window should pop up. Select the **Configuration** tab.

3. Click the **Add** button**.**

4. Double-click **Protocol**.

5. Highlight **Microsoft** under the list of manufactures.

6. Find and double-click **TCP/IP** in the list to the right (below)**.**



7. After a few seconds you will be brought back to the main Network window. The TCP/IP Protocol should now be listed.

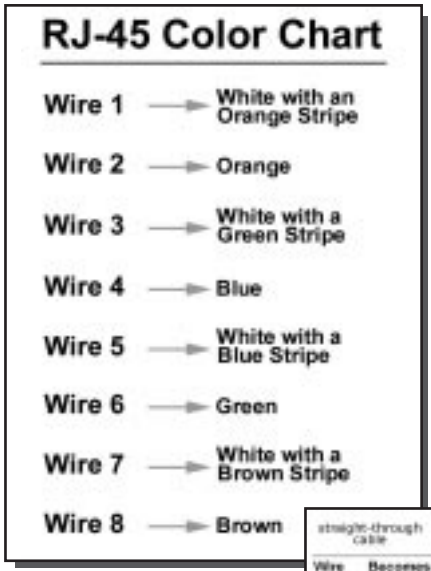
8. Click **OK**. Windows may ask for original Windows installation files. Supply them as needed (i.e.: D:\win98, D:\win95, c:\windows\options\cabs.)

9. Windows will ask you to restart the PC. Click **Yes**.

The TCP/IP Installation is complete.

Twisted-Pair Cabling

There are different grades, or categories, of twisted-pair cabling. Category 5 is the most reliable and is highly recommended. Category 3 is a good second choice. Straight-through cables are used for connecting computers to a hub. Crossover cables are used for connecting a hub to another hub (there is an exception: some hubs have a built-in uplink port that is crossed internally, which allows you to link or connect hubs together with a straight-through cable instead).

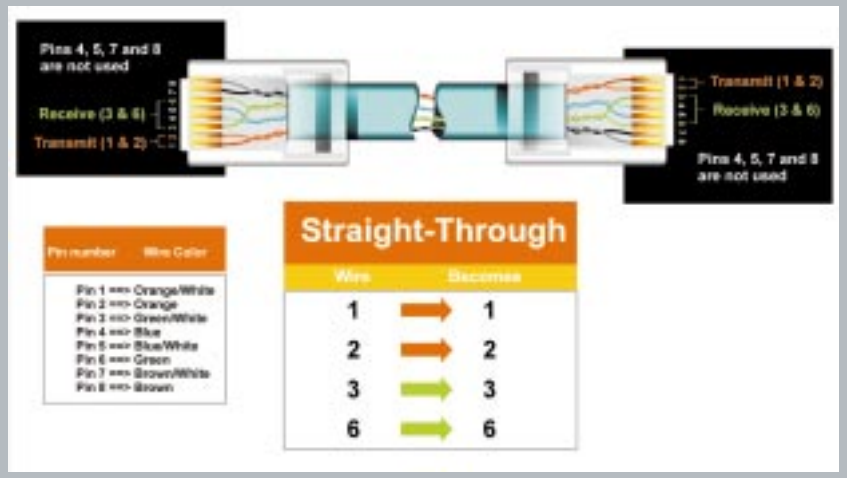


You can buy pre-made Category 5 cabling, or cut and crimp your own. Category 5 cables can be purchased or crimped as either straight-through or crossover. Inside a Category 5 cable are 8 thin, color-coded wires inside that run from one end of the cable to the other. All 8 wires are used. In a straight-through cable, wires 1, 2, 3, and 6 at one end of the cable are also wires 1, 2, 3, and 6 at the other end. In a crossover cable, the order of the wires change from one end to the other: wire 1 becomes 3, and 2 becomes 6. See the diagrams on the next page for more detailed information on straight-through and crossover cabling.

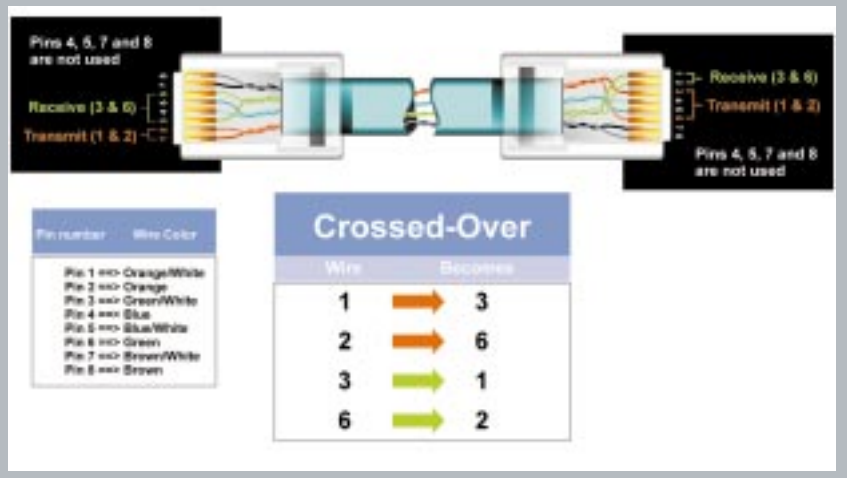
To determine which wire is wire number 1, hold the cable so that the end of the plastic RJ-45 tip (the part that goes into a wall jack first) is facing away from you. Face the clip down so that the copper side faces up (the springy clip will now be parallel to the floor).When looking down on the copper side, wire 1 will be on the far left.

Crimping Your Own Network Cables

- Straight-Through Cabling



- Cross-Over Cabling



4-Port Router Specifications

Model Number	BEFSR41
Standards	IEEE 802.3 10BaseT, 802.3u 100BaseTX
Protocol	CSMA/CD
Ports	Four 10/100 RJ45 Switched connectors (LAN) One 10Base-T Ethernet RJ-45 connector for ADSL/Cable Modem (WAN)
Speed	Router - 10Mbps, Switch - 10/100Mbps
Cabling Type	10BaseT: UTP/STP Category 3 or 5 100BaseTX: UTP/STP Category 5
Topology	Star
LED Indicators	Power. Link/Activity, Full Duplex/Collision, Speed for LAN. Link, Activity, Diag for WAN

Environmental

Dimensions	142 x 236 x 46 mm (5.6 x 9.3 X 1.8 inches)
Unit Weight	12 oz.
Power Input	External, 5VDC 3A
Certifications	FCC Class B, CE Mark Commercial
Operating Temperature	0°C to 40°C (32°F to 104°F)
Storage Temperature	-20°C to 70°C (-4°F to 158°F)
Operating Humidity	10% to 85% non-condensing
Storage Humidity	5% to 90% non-condensing

One-Port Router Specifications

Model Number	BEFSR11
Standards	IEEE 802.3 10BaseT, 802.3u 100BaseTX
Protocol	CSMA/CD
Ports	One 10BaseT/100BaseTX RJ-45 Port One10BaseT Broadband (WAN) Uplink Port
Speed	WAN Router: 10Mbps (10BaseT Ethernet) LAN: 10Mbps (10BaseT Ethernet) or 100Mbps (100BaseTX Fast Ethernet)
Cabling Type	10BaseT: Category 3 or 5 UTP/STP 100BaseTX: Category 5 UTP/STP
Topology	Star
LED Indicators	Power. Link/Activity, Full Duplex/Collision, Speed for LAN. Link, Activity, Diag for WAN

Environmental

Dimensions	142 x 236 x 46 mm (5.6 x 9.3 X 1.8”)
Unit Weight	14 oz.
Power Input	External, 7.5VDC, 7A
Certifications	FCC Class B, CE Mark Commercial
Operating Temperature	0°C to 40°C (32°F to 104°F)
Storage Temperature	-20°C to 70°C (-4°F to 158°F)
Operating Humidity	10% to 85%, non-condensing
Storage Humidity	5% to 90%, non-condensing

Customer Support

For help with the installation or operation of your Instant Broadband EtherFast Cable/DSL Router, contact Linksys Customer Support at one of the phone numbers or Internet addresses below.

Information	800-546-5797 (LINKSYS)
Customer Support	800-326-7114 949-261-1288
Fax	949-261-8868
Email	support@linksys.com
Web	http://www.linksys.com
FTP Site	ftp.linksys.com

http://www.linksys.com

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